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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/710,539	07/20/2004	Chun-Ming Cho	REAP0087USA	4538
27765	7590	07/12/2007		
NORTH AMERICA INTELLECTUAL PROPERTY CORPORATION P.O. BOX 506 MERRIFIELD, VA 22116			EXAMINER SINGH, HIRDEPAL	
			ART UNIT	PAPER NUMBER
			2611	
			NOTIFICATION DATE	DELIVERY MODE
			07/12/2007	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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## Office Action Summary

Application No.

10/710,539

Applicant(s)

CHO ET AL

Examiner

Hirdepal Singh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 20 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 July 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 7/30/04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

This action is in response to the original filing date of July 20, 2004. Claims 1-26 are pending in the application and have been considered below.

#### ***Drawings***

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: On page 14, paragraph 0031 of specification "...two correlators 130, 150 and a comparator 170....", however, in figure 3 there is no correlator marked as 150, and the comparator is marked as 60.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Specification***

2. The disclosure is objected to because of the following informalities: Paragraph 0029 (page 14) "...timing controller 114a ...", whereas figure 2 shows timing controller 129. Examiner suggests to change the reference number "timing controller 114a" to "timing controller 129" in the specification.

Appropriate correction is required.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-3, 5-7, 9, 10, 12, 14-16, 18-20, 22, 23, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Awater et al. (US 2005/0152317) in view of Gummadi et al. (US 7,136,436).

**Claims 1, and 14:** Awater discloses a method and apparatus for detecting a boundary and eliminating the inter symbol and multipath interference in a received stream of

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sample values (abstract; paragraph 0054) column 5, lines 12-22; column 6, lines 1-6)

comprising;

a correlator computing a correlation value between plurality of signals of first symbol and second symbol (figure 5; paragraphs 0037, and 0061), and using two differential correlation values from pair of differential correlators for detecting the signal packets (paragraphs 0040, and 0046-0047) (as clearly stated in claim number 6), and a comparator to determine which one of the correlation value has a higher sum (figure 5; paragraph 0056), and further discloses a controller that receives input from the boundary detection blocks and control different functions (figure4; paragraph 0034).

Awater discloses all of the subject matter as described above but doesn't explicitly disclose that the signals are transmitted via same sub-carriers, and the third signal is placed next to the first signal (not previous to first symbol) for calculating second correlation value.

However, Gummadi in the same field of endeavor, discloses a similar apparatus and method for boundary detection using multiple correlations, where the received signal is correlate with previous signal and both are transmitted through same channel (column 5, lines 58-67), also the system could be using a multi-carrier or single-carrier technique (column 9, lines 55-65), where the correlation value is generated by comparing samples in a period with samples in another adjacent period (abstract; column 6, lines 1-7, 35-42, and 56-67), and a control signal to control the functions of the system (figure 10).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the same carrier or sub-carrier as taught by Gummadi in Awater system to transmit the signals in order to get same modulation and demodulation for the signals of different symbols, and generate a correlation value by comparing adjacent period samples i.e. a period previous to first one or by comparing a period next to first one in order to see the presence of sequence boundary more rapidly and to make more reliable interference rejection.

**Claims 2, and 15:** Awater discloses all of the subject matter as described above, but doesn't explicitly disclose that the signals include a plurality of pilot and data signals.

However, Gummadi in the same field of endeavor discloses that the signal packets could be data signals and control signal i.e. pilot signals (column 1, lines 15-25).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to transmit symbols including plurality of pilot signals and data signals in Awater. One would have been motivated to include plurality of pilot signal and plurality of data signals in the symbols in order to get the real data send with the related control or reference information as well.

**Claims 3, and 16:** Awater discloses all of the subject matter as described above, and further discloses that the signal packets comprises sync bits i.e. a pilot signals

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(paragraph 0037), but doesn't explicitly disclose that the first, second, and third signals are different or not same.

However, Gummadi in the same field of endeavor discloses that the signals of periods are not same or they are different (figures 8a-c; column 8, lines 7-17).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to transmit different pilot signals for first, second, and third symbols in Awater. One would have been motivated to include different pilot signal in the symbols in order to get the related control or reference information.

**Claims 5, and 18:** Awater discloses all of the subject matter as described above, but doesn't explicitly disclose that first, second, and third signals are data signals.

However, Gummadi in the same field of endeavor discloses that the system is determining boundary between sequences of digital data streams (column 2, lines 1-5; sequences of data is interpreted as the signals are data signals).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to transmit symbols including all data signals as taught by Gummadi in Awater system in order to transmit the required information in the form of data as the all data signals contains more information.

**Claims 6, and 19:** Awater discloses all of the subject matter as described above, and further discloses that the signal packets comprises sync bits i.e. pilot signals (paragraph

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0037), but doesn't explicitly disclose that the corresponding first, second, and third signals are the same.

However, Gummadi discloses that the signals of periods could be all the same or they are matched (figures 8a; column 8, lines 1-6).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to transmit same pilot signals for first, second, and third symbols as taught by Gummadi in Awater system. One would have been motivated to include all the same pilot signals in the symbols in order to get the same timing and control information.

**Claims 7, and 20:** Awater discloses all of the subject matter as described above, and further discloses that the first correlator comprises;

- a. a conjugating unit for computing the conjugating value of first data (figures 5, and 7; paragraph 0047);
- b. multiplying unit for multiplying conjugated data with second data for generating product value (figures 5, and 7; paragraph 0047);
- c. correlation value computer generating correlation value according to product value i.e. an adder (figures 5, and 7; paragraph 0047).

**Claims 9, and 22:** Awater discloses all of the subject matter as described above, and further discloses that the correlation value is calculated based on square of the absolute



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value and then the squared values are added in a summation unit (paragraphs 0037, and 0056).

**Claims 10, and 23:** Awater discloses all of the subject matter as described above, and further discloses that the second correlator used for generating second correlation value comprises;

- a. a conjugating unit for computing the conjugating value of first data (figures 5, and 7; paragraph 0047);
- b. multiplying unit for multiplying conjugated data with the adjacent data(third data) for generating product value (figures 5, and 7; paragraph 0047);
- c. correlation value computer generating correlation value according to product value i.e. an adder (figures 5, and 7; paragraph 0047).

**Claims 12, and 25:** Awater discloses all of the subject matter as described above, and further discloses that the correlation value is calculated based on square of the absolute value and then the squared values are added in a summation unit (paragraphs 0037, and 0056).

5. Claims 8, 11, 21 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Awater et al. (US 2005/0152317) in view of Gummadi et al. (US 7,136,436) as applied to claims 1, 7, 10, 14, 20, and 23 above, and further in view of Narasimhan (US 7,218,691).

**Claims 8, and 21:** Awater, and Gummadi disclose all of the subject matter as described above, and Awater further discloses that the correlation value calculation includes a summation unit or an adder (figures 5, and 7; paragraph 0047), but doesn't explicitly disclose that the correlation is based on the absolute value of the product.

However, Narasimhan in same field of endeavor discloses a similar method and apparatus for estimating the timing of OFDM symbol by generating a correlation value with comparison of sum of correlation with a prior and a subsequent value (abstract; figure 8; column 2, lines 48-54), and further discloses that the correlation value is generated based on the sum of absolute values (column 2, lines 35-47).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use an absolute value calculating unit as taught by Narasimhan in Awater system to generate the correlation value in order to quantize the sign bits of the received signal.

**Claims 11, and 24:** Awater, and Gummadi disclose all of the subject matter as described above, and Awater further discloses that the correlation value calculation includes a summation unit or an adder (figures 5, and 7; paragraph 0047), but doesn't explicitly disclose that the correlation is based on the absolute value of the product.

However, Narasimhan in same field of endeavor discloses a similar method and apparatus for estimating the timing of OFDM symbol by generating a correlation value with comparison of sum of correlation with a prior and a subsequent value (abstract;

figure 8; column 2, lines 48-54), and further discloses that the correlation value is generated based on the sum of absolute values (column 2, lines 35-47).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use an absolute value calculating unit as taught by Narasimhan in Awater system to generate the correlation value in order to quantize the sign bits of the received signal.

6. Claims 4, 13, 17, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Awater et al. (US 2005/0152317) in view of Gummadi et al. (US 7,136,436) as applied to claims 1-3, and 14-16 above, and further in view of Mui (US 6,690,739).

**Claims 4, and 17:** Awater, and Gummadi disclose all of the subject matter as described above, but neither explicitly discloses that the value of first, second, and third signals are predetermined.

However, Mui in the same field of endeavor discloses a similar method and system for intersymbol interference compensation, and further discloses that the encoded sequence of symbols is a set of predetermined values (abstract; column 2, lines 5-20).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the first, second, and third signals with

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predetermined values in Awater in order to get at the receiver end the predetermined control or reference information.

**Claims 13, and 26** Awater, and Gummadi disclose all of the subject matter as described above, but neither explicitly discloses using an equalizer and a slicer for equalizing and then slicing the second symbol.

However, Mui in the same field of endeavor discloses a similar method and system for intersymbol interference compensation, and further discloses using an equalizer and a slicer in the inter symbol interference compensation decoder (figure 18; column 31, lines 18-57).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the equalizer and the slicer in Awater to equalize the second symbol and then slicing the symbol to generate a signal in order to cancel the intersymbol or multipath interferences in the signal. Similarly, one of ordinary skill in the art would use an equalizer and a slicer for the third symbol to generate third signal.

### ***Conclusion***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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- a. Taura et al. (US 6,438,183) discloses a system and receiver using plurality of correlation values for tuning the data.
- b. Dafesh (US 7,042,930) discloses a system for boundary correlation and acquisition with the use of plurality of correlations.
- c. Shimizu et al. (US 7,151,792) discloses a spread spectrum receiver using plurality of correlations for receiving and setting the timings of the signals.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hirdepal Singh whose telephone number is 571-270-1688. The examiner can normally be reached on Mon-Fri (Alternate Friday Off) 8:00AM-5:00PMEST.

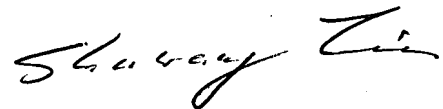
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on 571-272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HS  
July 6, 2007

Shuwang Liu  
SPE 2611



**SHUWANG LIU**  
**SUPERVISORY PATENT EXAMINER**